Next Generation
Do it Yourself AutoScanner®

Performs diagnostics on OBD II compliant vehicles

Instructions in English, Spanish, and French
Instrucciones en Inglés, Español, y Francés
Instructions en Anglais, Espagnol, et les Français

actron®
precision electronic solutions
15825 Industrial Parkway
Cleveland Ohio 44135 USA (EUA)

Tool Information

Complete the following list.
Provide this information when
contacting customer support.

Serial No: _____

SW ID: _____

Refer to section 4.7 to get the Serial Number (Serial No) and Software Identification (SW ID.)

If you have questions or concerns Contact **Technical Support**:

- **Phone:** 1-800-228-7667
- **Web Site:** www.actron.com
- **Mail:** SPX Service Solutions
  15825 Industrial Parkway
  Cleveland, Ohio 44135

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Safety Precautions

For safety, read, understand and follow all safety messages and instructions in manual and on test equipment before operating tool.

Always refer to and follow safety messages and test procedures provided by manufacturer of vehicle and tools.

Safety messages below and throughout this manual are reminders to use caution when using tool.

Safety Messages

Safety messages are provided to help prevent personal injury and equipment damage.

Safety messages in this section of the manual have a signal word with a 3 part message and, in some cases, an icon. The signal word indicates the level of the hazard.

Signal Words Used:

⚠DANGER — **Indicates a possible hazardous situation which, if not avoided, will result in death or serious injury to operator or bystanders.**

⚠WARNING — **Indicates a possible hazardous situation which, if not avoided, could result in death or serious injury to operator or bystanders.**

⚠CAUTION — **Indicates a possible hazardous situation which, if not avoided, may result in moderate or minor injury to operator or bystanders.**

IMPORTANT — **Indicates a condition which, if not avoided, may result in damage to test equipment or vehicle.**

Type Styles Used:

Normal type states hazard.

Bold type states how to avoid hazard.

Italic type states possible results of not avoiding hazard.

Icons used:

An icon, when present, gives a graphical description of possible hazard.

Example:

Engine systems can malfunction spilling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

- **Wear safety goggles and protective gloves**
  - User and bystander
  - Even if your everyday glasses have impact resistant lenses, they may NOT be safety glasses, and may not provide adequate protection.

Engine systems that malfunction can cause injury.

Important Safety Messages

Risk of electric shock.

- **Do not exceed voltage limits between inputs indicated in "Specifications."**
- **Use extreme caution when working with circuits that have greater than 60 volts DC or 24 volts AC.**

Electric shock can cause injury.

Risk of explosion.

- **Wear safety goggles and protective clothing.**
  - User and bystander
  - Even if your everyday glasses have impact resistant lenses, they may NOT be safety glasses, and may not provide adequate protection.
- **Do not use Tool in environments where explosive vapors may collect.**
  - As in below-ground pits, confined areas, or areas that are less than 18 inches above floor.
- **Use Tool in locations with mechanical ventilation providing at least 4 air changes per hour.**
- **Flammable fuel and vapors can ignite.**
- **Do not smoke, strike a match, or cause a spark in vicinity of battery.**

Battery gases can ignite.

- **Avoid making accidental connection between battery terminals.**
  - Do not place uninsulated metal tools on battery.
- **When removing battery cables, remove ground cable first.**
- **Avoid sparks when connecting or disconnecting power leads to battery.**
- **Make sure ignition is OFF, headlights and other accessories are OFF and vehicle doors are closed before disconnecting battery cables.**
  - This also helps prevent damage to on-board computer systems.
- **Always disconnect battery ground connections before servicing electrical system components.**

Explosion can cause injury.

Risk of poisoning.

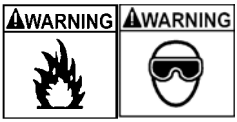
- **Use Tool in locations with mechanical ventilation providing at least 4 air changes per hour. Engine exhaust contains odorless lethal gas.**
- **Route exhaust outside while testing with engine running.**

Poisoning can result in death or serious injury.

Battery acid is a highly corrosive sulfuric acid.

- **Wear safety goggles and protective gloves.**
  - User and bystander
  - Even if your everyday glasses have impact resistant lenses, they may NOT be safety glasses, and may not provide adequate protection.
- **Make sure someone can hear or is close enough to provide aid when working near a battery.**
- **Have plenty of fresh water and soap nearby.**
  - If battery acid contacts skin, clothing, or eyes, flush exposed area with soap and water for 10 minutes.
  - Seek medical help.
- **Do not touch eyes while working near battery.**

Battery acid can burn eyes and skin.



Risk of fire.

- **Wear safety goggles and protective clothing.**
  - User and bystander
  - Even if your everyday glasses have impact resistant lenses, they may NOT be safety glasses, and may not provide adequate protection.
- **Do not position head directly over or in front of throttle body.**
- **Do not pour gasoline down throttle body when cranking or running engine, when working with fuel delivery systems or any open fuel line.**
  - Engine backfire can occur when air cleaner is out of position.
- **Do not use fuel injector cleaning solvents when performing diagnostic testing.**
- **Keep cigarettes, sparks, open flame and other sources of ignition away from vehicle.**
- **Keep a dry chemical (Class B) fire extinguisher rated for gasoline, chemical and electrical fires in work area.**

Fire can cause death or serious injury.

Risk of flying particles.

- **Wear safety goggles while using electrical equipment.**
  - Electrical equipment or rotating engine parts can cause flying particles.
  - Even if your everyday glasses have impact resistant lenses, they may NOT be safety glasses, and may not provide adequate protection.

Flying particles can cause eye injury.

Risk of burns.

- **Batteries can produce a short-circuit current high enough to weld jewelry to metal.**
  - Remove jewelry such as rings, bracelets and watches before working near batteries.

Short circuits can cause injury.

Risk of burns.

- **Do not remove radiator cap unless engine is cold.**
  - Pressurized engine coolant may be hot.
- **Do not touch hot exhaust systems, manifolds, engines, radiators, sample probe, etc.**
- **Wear insulated gloves when handling hot engine components.**
- **Tester leads can become hot after extended testing in close proximity to manifolds etc.**

Hot components can cause injury.

Risk of spilling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

- **Wear safety goggles and protective clothing**
  - User and bystander
  - Even if your everyday glasses have impact resistant lenses, they may NOT be safety glasses, and may not provide adequate protection.
- **Engine systems can malfunction**
  - Expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

Fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris can cause serious injury.

Engine compartment contains electrical connections and hot or moving parts.

- **Keep personnel, test leads, clothing and other objects clear of electrical connections and hot or moving engine parts.**
- **Do not wear watches, rings, or loose fitting clothing when working in an engine compartment.**
- **Do not place tools on fenders or other places in engine compartment.**
- **To help identify danger zones in test areas use barriers.**
- **Prevent personnel from walking through test area.**

Contacting electrical connections and hot or moving parts can cause injury.

Risk of injury.

- **Only qualified personnel should operate tool.**
- **Use tool only as described in guide.**
- **Do not operate tool with damaged cords.**
- **Do not operate tool if dropped or damaged, until examined by a qualified service representative.**

Operation of tool by anyone other than qualified personnel may result in injury.

Risk of unexpected vehicle movement.

- **Block drive wheels before performing a test with engine running.**
- **Unless instructed otherwise:**
  - set parking brake
  - put gear selector in neutral for standard transmissions
  - put gear selector in park for automatic transmissions
  - disconnect release mechanism on automatic parking brake release, for testing and reconnect when testing is completed.
- **Do not leave engine running unattended.**

A moving vehicle can cause injury.

⚠CAUTION

Risk of equipment or circuit damage.

- **Unless specifically directed by manufacturer, make sure ignition is OFF before connecting or disconnecting connectors or any vehicle electrical terminals.**
- **Do not create a short between battery terminals with a jumper wire or tools.**

Improper equipment use can cause equipment or circuit damage.

⚠CAUTION

Misdiagnosis may lead to incorrect or improper repair and/or adjustment.

- **Do not rely on erratic, questionable, or obviously erroneous test information or results.**
  - Make sure all connections and data entry information are correct and test procedures performed right, if test information or results are erratic, questionable, or obviously erroneous.
  - If test information or results are still suspicious, do not use them for diagnosis.

Improper repair and/or adjustment may cause vehicle or equipment damage or unsafe operation.

⚠ DANGER

Some vehicles are equipped with air bags.

- **Follow vehicle service manual's warnings when working around air bag components or wiring.**
  - If service manual instructions are not followed, air bag may open unexpectedly, resulting in injury.
  - Note air bag can still open up several minutes after ignition key is off (or if vehicle battery is disconnected) because of a special energy reserve module.

An air bag opening can cause injury.

Section 1 – Getting Started

The Global OBD II AutoScanner ® was developed by experts in the automotive service industry to help diagnose vehicles and assist in troubleshooting procedures.

AutoScanner ® monitors vehicle events and retrieves codes from vehicle's control module to help pinpoint problem areas.

All information, illustrations and specifications contained in this manual are based on the latest information available from industry sources at the time of publication.

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Using CD

✓ The Included CD is **NOT** required to operate AutoScanner ®.

✓ Some of the items included on the CD are:

- ❒ Manuals included with AutoScanner ®.
- ❒ DTC Lookup Software.
- ❒ Adobe Acrobat Reader.
- ❒ Other Product Information.

✓ To be able to use the included CD the PC must meet the following minimum requirements:

- ❒ 486 PC.
- ❒ 4 MB of RAM.
- ❒ Microsoft Windows 95 or Newer.
- ❒ CD ROM Drive.
- ❒ Adobe Acrobat Reader.
- ❒ Internet Explorer 4.0 or Newer.
- ❒ Screen Resolution of 800 x 600
  - – If screen resolution is 800 x 600, in Display Properties, Settings Tab, set Font Size to Small Fonts.

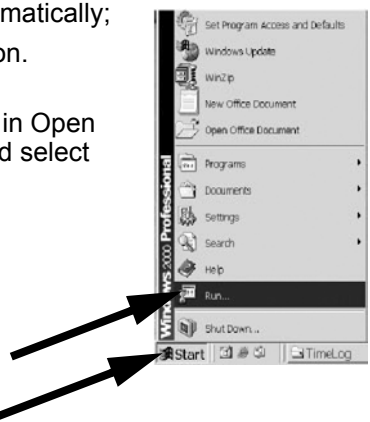
Running Applications On Included CD

1.Close All Programs on Computer.

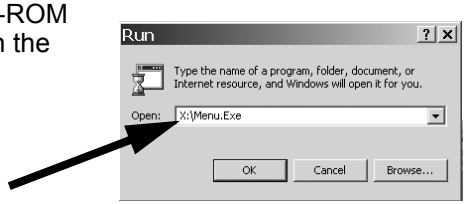
2.Place Included CD in CD-Drive.

✓ If CD does not start automatically;

- ❒ Select the ***Start*** button.
- ❒ Select ***Run...***
- ❒ Enter "*X*:\Menu.Exe" in Open Box on Computer and select OK.



- ❒ "*X*" is the CD-ROM drive letter on the computer.



3.Observe Menu Appears.

4.Follow screen prompts on computer to run applications.

Vehicle Service Information

The following is a list of web sites and phone numbers where electronic engine control diagnostic information is available.

✓ Some manuals may be available at your local dealer, auto parts stores or local public libraries

			Web Site	Phone Number
Domestic Vehicles	**General Motors**	Chevrolet	www.chevrolet.com	1-800-551-4123
		Pontiac	www.pontiac.com	1-800-551-4123
		Oldsmobile	www.oldsmobile.com	1-800-551-4123
		Buick	www.buick.com	1-800-551-4123
		Cadillac	www.cadillac.com	1-800-333-4CAD
		Saturn	www.saturn.com	1-800-553-6000
	Ford	Ford	www.ford.com	1-800-392-3673
		Lincoln	www.lincoln.com	1-800-392-3673
		Mercury	www.mercury.com	1-800-392-3673
	Chrysler	Chrysler	www.chrysler.com	1-800-348-4696
		Dodge	www.dodge.com	1-800-348-4696
		Plymouth	Not Available	1-800-348-4696
		Eagle	Not Available	1-800-348-4696
European Vehicles		Audi	www.audi.com	1-800-544-8021
		Volkswagon	www.vw.com	1-800-544-8021
		BMW	www.bmw.com	1-201-307-4000
		MINI	www.mini.com	1-201-307-4000
		Jaguar	www.jaguar.com	1-800-4-JAGUAR
		Volvo	www.volvo.com	1-800-458-1552
		Mercedes	www.mercedes-benz.com	1-800-367-6372
		Land Rover	www.landrover.com	1-800-637-6837
		Porsche	www.porsche.com	1-800-PORSCHE
		Saab	www.saab.com	1-800-955-9007
Asian Vehicles		Acura	www.acura.com	1-800-999-1009
		Honda	www.honda.com	1-800-999-1009
		Lexus	www.lexus.com	1-800-255-3987
		Scion	www.scion.com	1.866.70.SCION
		Toyota	www.toyota.com	1-800-GO-TOYOTA
		Hyundai	www.hyundai.com	1-800-633-5151
		Infiniti	www.infiniti.com	1-800-662-6200
		Nissian	www.nissianusa.com	1-800-nissian1
		Kia	www.kia.com	1-800-333-4542
		Mazda	www.mazda.com	1-800-222-5500
		Daewoo	www.daewoo.com	1-822-759-2114
		Subaru	www.subaru.com	1-800-SUBARU3
		Isuzu	www.isuzu.com	1-800-255-6727
		Geo	Not Available	Not Available
		Mitsubishi	www.mitsubishi.com	1-888-MITSU2004
		Suzuki	www.suzukiauto.com	1-800-934-0934
Other Manuals		Chilton Book Company	www.chiltonsonline.com	1-800-347-7707
		Haynes Publications	www.haynes.com	1-800-242-4637
		Bentley Publishers	www.bentleypublishers.com	1-800-423-4595
Repair Information Programs		Mitchell	www.mitchell1.com	1-888-724-6742
		ALLDATA	www.alldata.com	1-800-697-2533
Suitable Manual Titles		“Diagnostic Service Manuals”		
		“PowerTrain Codes and Oxygen Sensors”		
		“Automotive Emission Control Manual”		
		“Fuel Injection”		
		“Automotive Electrical Manual”		
		“Automotive Electrics and Electronics”		
		“Automotive Sensors”		
		“Electronic Transmission Control”		
		“Emission Control Technology		
		“Engine Management”		
		or similar titles...		

Introduction to On-Board Diagnostics

OBD II (On-Board Diagnostics version II) is a system that the Society of Automotive Engineers (SAE) developed to standardize automotive electronic diagnosis.

Beginning in 1996, most new vehicles sold in the USA were OBD II compliant.

✓ Technicians now can use the same tool to test any OBD II compliant vehicle without special adapters. SAE established guidelines that provide:

- ❒ A universal connector, called the Data Link Connector (DLC), with dedicated pin assignments.
- ❒ A standard location for the Data Link Connector (DLC), visible under the dash on driver's side.
- ❒ A standard list of diagnostic trouble codes (DTCs) used by all manufacturers.
- ❒ A standard list of parameter identification (PID) data used by all manufacturers.
- ❒ Ability for vehicle systems to record operating conditions when fault occurs.
- ❒ Expanded diagnostic capabilities that records a code whenever a condition occurs that affects vehicle emissions.
- ❒ Ability to clear stored codes from vehicles memory with Tool.

SAE Publications

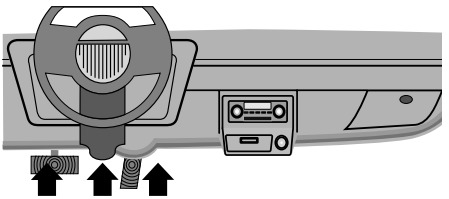
SAE has published hundreds of pages of text defining a standard communication protocol that establishes hardware, software, and circuit parameters of OBD II systems.

- SAE publishes recommendations, not laws, but the Environmental Protection Agency (EPA) and California Air Resources Board (CARB) made many of SAE's recommendations legal requirements.

Data Link Connector (DLC)

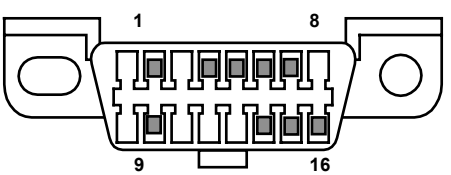
The AutoScanner ® uses a Data Link Connector (DLC) to communicate with the vehicle's control module.

✓ Data Link Connector Location.



- ❒ Under dashboard on driver side of vehicle.
- ❒ If Data Link Connector is not located under dashboard, a label should be there telling where the connector can be found.

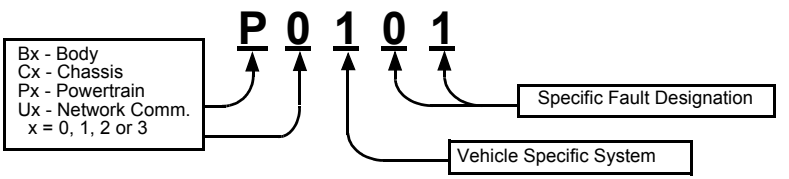
Data Link Connector (DLC) Pins



1 - Manufacturer Reserved
2 - J1850 Bus+
3 - Manufacturer Reserved
4 - Chassis Ground
5 - Signal Ground
6 - CAN High, J-2284
7 - K Line, ISO 9141-2 & ISO/DIS 14230-4
8 - Manufacturer Reserved
9 - Manufacturer Reserved
10 - J1850 Bus-
11 - Manufacturer Reserved
12 - Manufacturer Reserved
13 - Manufacturer Reserved
14 - CAN Low, J-2284
15 - L Line, ISO 9141-2 & ISO/DIS 14230-4
16 - Battery Power

Diagnostic Trouble Codes (DTCs)

- ✓ Diagnostic Trouble Codes help determine the cause of a problem or problems with a vehicle.
  - ❒ Diagnostic Trouble Codes (DTCs) consist of a five-digit alphanumeric code.
  - ❒ The Diagnostic Trouble Codes format and general code types are shown below.



Example:
P0101 - Mass or Volume Air Flow Circuit Range/Performance Problem

Powertrain Codes
P0xxx - *Generic (SAE)*
P1xxx - *Manufacturer Specific*
P2xxx - *Generic (SAE)*
P30xx-P33xx - *Manufacturer Specific*
P34xx-P39xx - *Generic (SAE)*

Chassis Codes
C0xxx - *Generic (SAE)*
C1xxx - *Manufacturer Specific*
C2xxx - *Manufacturer Specific*
C3xxx - *Generic (SAE)*

Body Codes
B0xxx - *Generic (SAE)*
B1xxx - *Manufacturer Specific*
B2xxx - *Manufacturer Specific*
B3xxx - *Generic (SAE)*

Network Communication Codes
U0xxx - *Generic (SAE)*
U1xxx - *Manufacturer Specific*
U2xxx - *Manufacturer Specific*
U3xxx - *Generic (SAE)*

Within each category (Powertrain, Chassis, Body and Network) of Diagnostic Trouble Codes there are assigned ranges for different vehicle systems.

Lower	Upper	Assigned DTC System
P0000	P00FF	Fuel Air Metering Auxiliary Emission Controls
P0100	P02FF	Fuel Air Metering
P0300	P03FF	Ignition System or Misfire
P0400	P04FF	Auxiliary Emission Controls
P0500	P05FF	Vehicle Speed Idle Control Auxiliary Inputs
P0600	P06FF	Computer and Auxiliary Outputs
P0700	P09FF	Transmission
P0A00	P0AFF	Hybrid Propulsion
P1000	P10FF	Manufacturer Control Fuel & Air Metering, Auxiliary Emission Controls
P1100	P12FF	Manufacturer Control Fuel & Air Metering
P1300	P13FF	Manufacturer Control Ignition System or Misfire
P1400	P14FF	Manufacturer Control Auxiliary emission Controls
P1500	P15FF	Manufacturer Cntrl Veh.Spd. Idle Speed Control Auxiliary Inputs
P1600	P16FF	Manufacturer Control Auxiliary Inputs Auxiliary Outputs
P1700	P19FF	Manufacturer Control Transmission
P2000	P22FF	Fuel Air Metering Auxiliary emission Controls
P2300	P23FF	Ignition System or Misfire
P2400	P24FF	Auxiliary Emission Controls
P2500	P25FF	Auxiliary Inputs
P2600	P26FF	Computer and Auxiliary Outputs
P2700	P27FF	Transmission
P2900	P32FF	Fuel Air Metering Auxiliary Emission Controls
P3300	P33FF	Ignition System
P3400	P34FF	Cylinder Deactivation
U0000	U00FF	Network Electrical
U0100	U02FF	Network Communication
U0300	U03FF	Network Software
U0400	U04FF	Network Data

- ✓ J2012 and ISO 15031-6 are standards for all Diagnostic Trouble Codes, established by the SAE, International Organization for Standardization (ISO) and other governing bodies.
  - ❒ Codes and definitions assigned by these specifications are known as Generic OBD II codes.
  - ❒ OBD II requires compliance to these standards, for all cars, light trucks, APVs, MPVs, and SUVs sold in the U.S.
  - ❒ Codes not reserved by SAE are manufacturer reserved and referred to as Manufacturer Specific Codes.

Section 2 – AutoScanner ® Specifications & Power Information

The AutoScanner ® Keypad Configuration

❶ **LCD Display** – 128 x 64 graphic display with contrast adjust.
❷ **UP** arrow key – moves UP through functions and picks YES on questions requiring a yes or no answer.
❸ **ENTER** key – selects displayed items.
❹ **DOWN** arrow key – moves DOWN through functions and picks NO on questions requiring a yes or no answer.
❺ **BACK** key – usually returns to previous screen or ***DIAGNOSTIC MENU*** and cancels the prior selection.
❻ **ERASE** hot key – used to run the Erase function.
❼ **POWER** key – turns power ON or OFF when disconnected from vehicle.
❽ **OBDII Cable** – provides connection for vehicle interface.
❾ **Serial Port** – gives a way to get upgrades for the AutoScanner ®.
❿ **Serial Number Plate** – (On Back) shows serial number.
⓫ **Battery Compartment** – provides power to AutoScanner ® for upgrading or reviewing codes off-vehicle.

Specifications

Display: 128 x 64 pixel display with contrast adjust.
Operating Temperature: 0 to 50°C (32 to 122°F)
Storage Temperature: -20 to 70°C (-4 to 158°F)
External Power: 7 to 16 Volts

✓ A minimum of 8.0 V is required for most control modules to operate properly in a vehicle.

Power Dissipation: 5 Watts maximum

Dimensions:	**Thickness**	**Width**	**Length**
	1.125"	3.25"	7.75"
	28.6 mm	82.6 mm	196.9 mm

Included with AutoScanner ®

Part	Part Description	Part Number
Manual	Used to give an understanding on how to operate the tool.	0002-2826
CD	The CD includes: - DTC Lookup Software - for looking up DiagnosticTrouble Codes. - Manual - Other Product Information	1000-5287
Product Registration	Used to Register Tool for troubleshooting concerns and updating tool.	0002-2306

✓ **Replacement Parts** are available from the manufacturer by contacting customer service.

- Phone: **1-800-228-7667** (8:00 - 6:00 EST Monday - Friday)

Display

The display has a large viewing area displaying messages, instructions, and diagnostic information.

✓ The Liquid Crystal Display (LCD) is a 128 x 64 pixel display.

❒ Characters used to help operate AutoScanner ® are:

Indicates current selection.

Indicates additional information is available on previous screen.

Indicates additional information is available on next screen.

Pending Indicates the code is a pending code. Refer to the **Read Codes** Section for more details.

Appears if the **ERASE** hot key is available.

Indicates to install or replace the internal battery soon.

Keypad

The keypad is used to move through the different menus of the AutoScanner ®.

⚠CAUTION Do not use solvents such as alcohol to clean keypad or display. Use a mild nonabrasive detergent and a soft cotton cloth.

⚠CAUTION Do not soak keypad as water might find its way inside the AutoScanner ®.

Power

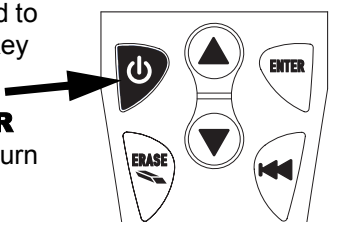
Internal Battery

✓ The ***Internal Battery*** allows the operator to Review Data or look up Diagnostic Trouble Code definitions without being connected to a vehicle.

✓ Refer to “Tool Does Not Power Up” if there are problems.

✓ When the tool is not connected to the vehicle the **POWER** key turns tool ON and OFF.

- ❒ Press and hold **POWER** key for at least 1 second to turn ON AutoScanner ®.



✓ When powered from the internal battery, AutoScanner ® turns OFF after a period of inactivity.

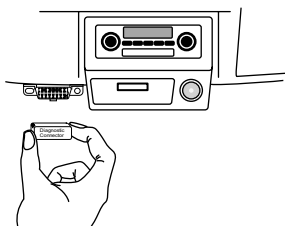
✓ The AutoScanner ® checks the internal battery when turning on tool.

- ❒ If voltage is low, Low Battery Symbol ( ) displays on screen.
- ❒ Replace battery with instructions provided in “Battery Replacement.”

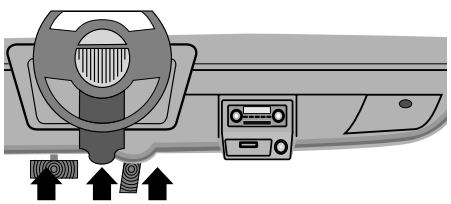
⚠CAUTION Remove battery from battery compartment if AutoScanner ® is not going to be in use for an extended period of time.

Vehicle Power

When using the OBDII Cable, the power to the AutoScanner ® comes from the vehicle Data Link Connector (DLC.)

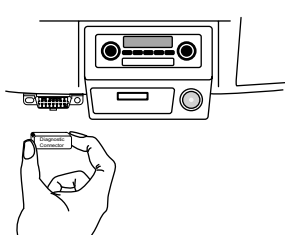


1.Find Data Link Connector on Vehicle.



- Under dashboard on driver side of vehicle.
- If Data Link Connector is not located under the dashboard, a label should be there telling where the connector can be found.

2.Remove Data Link Connector Cover if Required.



3.Connect OBD II Cable to Vehicle.

- •Make sure pins are not bent.
- •Carefully align cable plug and push straight into Data Link Connector (DLC).

4.Observe AutoScanner ® Turns On.

Section 3 – Using AutoScanner ®: Diagnostic Trouble Codes (DTCs) and Data

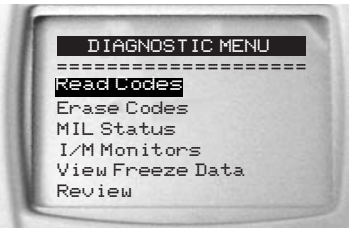
Read Codes

The ***Read Codes*** function allows the AutoScanner ® to read the Diagnostic Trouble Codes (DTCs) and Pending Codes from the vehicle's computer modules.

- ✓ Diagnostic Trouble Codes (DTCs) help determine the cause of a problem or problems with a vehicle.
- ✓ ***Read Codes*** can be done with the Key On Engine Off (KOEO) or with the Key On Engine Running (KOER).
- ✓ "Continuous monitor" and "maturing codes" are other names for ***Pending Codes***.
- ✓ If ***Pending Codes*** or faults occur a specific number of times (depending on vehicle), they mature into a DTC and the MIL lights or blinks.
- ✓ If a fault does not occur within a certain number of warm-up cycles (depending on vehicle), the ***Pending Code*** or ***Diagnostic Trouble Code*** clears from vehicle's computer module.
- ✓ ***Pending Code*** faults, DO NOT automatically indicate a faulty component or system.

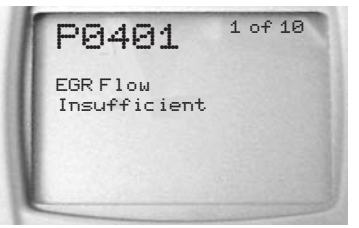
1. Select *Read Codes*.

- Use **UP** or **DOWN** arrow key to highlight ***Read Codes***.
- Press **ENTER**.

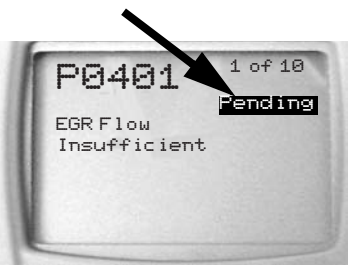


2. View Diagnostic Trouble Codes.

- Use **UP** or **DOWN** arrow key if more than one Diagnostic Trouble Code is present.
- Display shows the number of Diagnostic Trouble Codes present on the top right section of the display.



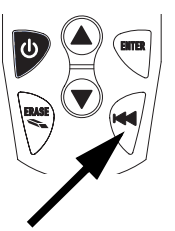
❒ Example shows a Pending Diagnostic Trouble Code.



✓ Additional Diagnostic Trouble Codes are available on the **DTC Lookup CD** software.

3. Return to *DIAGNOSTIC MENU.*

- Press **BACK** key.



Erase Codes

The ***Erase Codes*** function deletes Diagnostic Trouble Codes and clears I/M Monitors from vehicle's computer module(s). (See ***I/M Monitors***.)

✓ The ***Erase Codes*** function may also erase ***View Freeze Data*** results depending on vehicle.

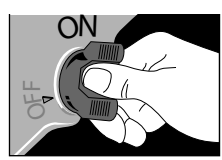
✓ Check vehicle systems completely before using the ***Erase Code*** function.

- ❒ Erase stored Diagnostic Trouble Codes and verify no codes reset. A Diagnostic Trouble Code returns if problem is not fixed or other faults are present.

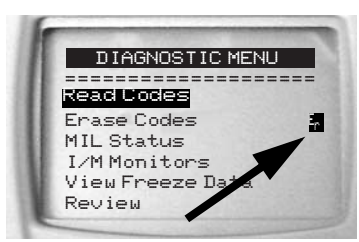
✓ Before deciding repairs are done vehicle may need to be driven so monitors can run.

✓ With the engine running a reject message could display when trying to erase codes.

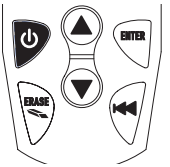
1. Prepare Vehicle.
- •Turn Key On.
- •Verify Engine Off.



✓ If **ERASE** hot key is available to be used an icon shows on the display.

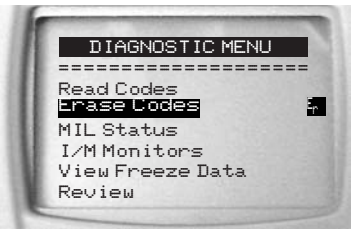


2.Press ERASE Hot Key.

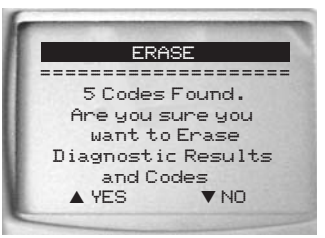


OR

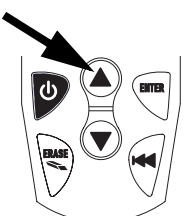
2.Select *Erase Codes*.
- Use **UP** or **DOWN** arrow key to highlight ***Erase Codes***.
- Press **ENTER.**



✓ If diagnostic results and codes are not to be erased press **DOWN** arrow key for NO.



3.Press UP Arrow Key for YES to Clear Diagnostic Results and Codes.



✓ The screen shown appears if engine is running.

4. Observe "Command Sent" Message Displays.
•Press **ENTER**.

✓ A Diagnostic Trouble Code may remain if problem is not fixed or other faults are present.

MIL (Malfunction Indicator Lamp) Status

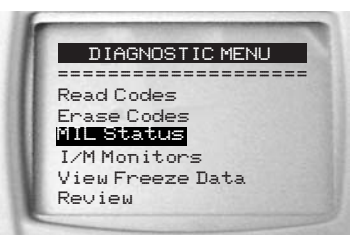
MIL Status displays the state of the vehicles computer module(s).

✓ ***MIL Status*** is most useful if the engine is running.

✓ Some manufacturers turn the MIL off if a certain number of drive cycles occur without a fault.

✓ The computer's memory erases Trouble Codes and resets MIL from memory if fault does not occur after 40 warm-up cycles.

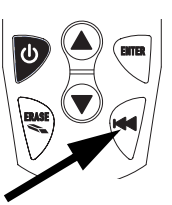
1. Select *MIL Status*.
- Use **UP** or **DOWN** arrow key to highlight ***MIL Status***.
- Press **ENTER.**



2. Review Results.

OR

3. Return to *DIAGNOSTIC MENU.*
- Press **BACK** key.



I/M Monitors (Emissions Systems)

The ***I/M Monitors*** (Inspection / Maintenance) function is used to view a **SNAPSHOT** of the operations for the Emission System on OBD II vehicles since the Diagnostic Trouble Codes were cleared.

✓ I/M Monitors is a very useful function. To guarantee no faults make sure all monitors are “ok” or “n/a” and no DTC’s exist.

✓ During normal driving conditions, the vehicle’s computer scans the emission system. After a specific amount of drive time (each monitor has specific driving conditions and time required), the computer’s "monitors" will decide if the vehicles emission system is working correctly or not as well as detecting out of range values. When the "monitor’s" status is:

- **"ok" -** vehicle was driven enough to complete the monitor.
- **"inc" (Incomplete) -** vehicle was not driven enough to complete the monitor.
- **"n/a" (Not Applicable) -** vehicle does not support that monitor.

✓ Some states **MAY NOT** require all monitors listed to be Ready to pass the emissions test. Check with state testing site for exact requirements. All states will fail a vehicle that has the MIL Light lit at time of test.

✓ Refer to the vehicles service manual for the drive cycle operation.

✓ Depending on vehicle, disconnecting or a discharged battery may erase trouble codes and clear monitor status.

✓ Clear Monitors by:

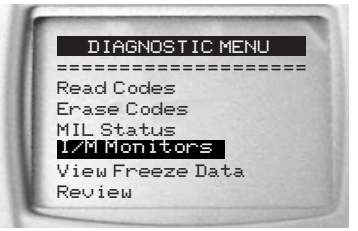
- ❒ Erasing Codes.
- ❒ Vehicle Computer Module losing power (on some vehicles.)

✓ ***I/M Monitors*** function can be done with the Key On, Engine Running or Off.

1. Select *I/M Monitors.*

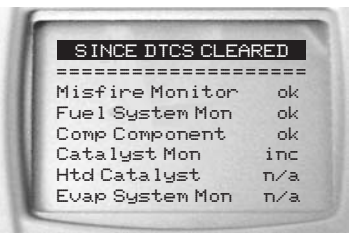
•Use **UP** or **DOWN** arrow key to highlight ***I/M Monitors***.

•Press **ENTER.**



2. View Summary of Monitor Status.

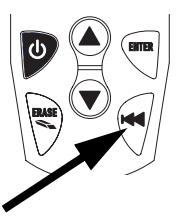
•Use **UP** or **DOWN** arrow key.



Abbreviate Name	Expanded Name
Misfire Monitor	Misfire Monitor
Fuel System Mon	Fuel System Monitor
Comp Component	Comprehensive Components Monitor
Catalyst Mon	Catalyst Monitor
Htd Catalyst	Heated Catalyst Monitor
Evap System Mon	Evaporative System Monitor
Sec Air System	Secondary Air System Monitor
A/C Refrig Mon	Air Conditioning Refrigerant Monitor
Oxygen Sens Mon	Oxygen Sensor Monitor
Oxygen Sens Htr	Oxygen Sensor Heater Monitor
EGR System Mon	Exhaust Gas Recirculation System Monitor

3. Return to *DIAGNOSTIC MENU.*

• Press **BACK** key.



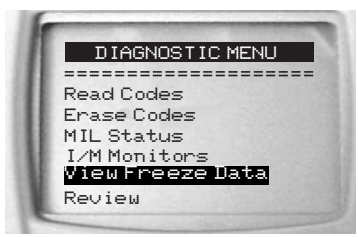
View Freeze Data

View Freeze Data is a “snapshot” of the operating conditions at the time of an emission-related fault.

✓ Faults with higher priority can overwrite ***View Freeze Data***.

✓ Depending on when vehicle DTCs were last erased, ***Freeze Frame Data*** may not be stored in vehicles memory.

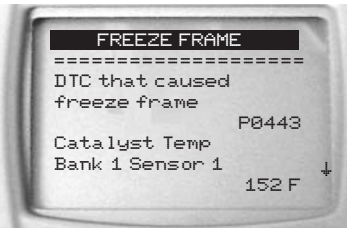
1. **Select *View Freeze Data.***
   - Use **UP** or **DOWN** arrow key to highlight ***View Freeze Data***.
   - Press **ENTER.**



✓ While collecting data, several screens show.

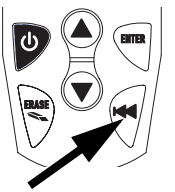
2. **Select DTC (if more than 1 DTC is present.)**
   - Use **UP** or **DOWN** arrow key to highlight desired frame.
   - Press **ENTER.**

3.View Freeze Data.



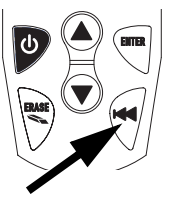
4.Select another frame to view (if available.)

• Press **BACK** key.



5.Return to *DIAGNOSTIC MENU.*

• Press **BACK** key.

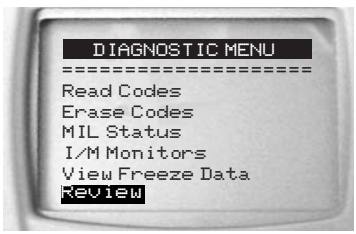


Review

The ***Review*** function allows the user to view the previous vehicle tested information.

✓ AutoScanner® requires power from either the vehicle or the internal battery to use the ***Review*** function.

1. Select *Review.*
- Use **UP** or **DOWN** arrow key to highlight ***Review***.
- Press **ENTER.**



✓ The ***Review*** function has three types of data:

- ❒ Codes
- ❒ I/M Monitors
- ❒ View Freeze Data

2. Follow Instructions on Tool.

✓ Refer to ***Read Codes***, ***I/M Readiness*** and ***View Freeze Data*** for more detailed information.

Code Lookup

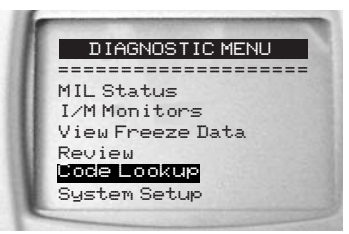
Code Lookup is a database of Diagnostic Trouble Code (DTC) definitions contained in the AutoScanner ®.

✓ Use **Code Lookup** to look up definitions of Diagnostic Trouble Codes (DTCs.)

✓ The AutoScanner ® requires power from vehicle or the internal battery to perform this function.

1. Select *Code Lookup.*

- Use **UP** or **DOWN** arrow keys to highlight ***Code Lookup***.
- Press **ENTER.**



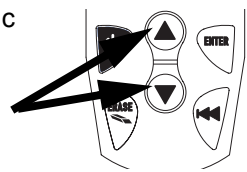
2. Enter Code:

- Enter all characters
- Change characters one at a time.
- Use **ENTER** to change to next position.
- Use **UP** or **DOWN** arrow keys to change selected character.

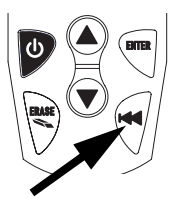
✓ The DTC Range Definition shows if the definition is manufacturer specific. If the DTC Range Definition does not exist, the Tool shows “No DTC Definition Found. See Service Manual.” See **Diagnostic Trouble Code** section for DTC Range Definitions.

✓ Additional Diagnostic Trouble Codes are available on the **DTC Lookup CD** software.

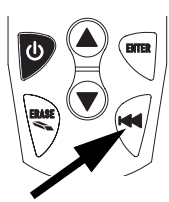
✓ To View Previous or Next Diagnostic Trouble Code use **UP** or **DOWN** arrow key.



✓ To enter another Diagnostic Trouble Code, press **BACK** key.



✓ Press **BACK** key again to return to ***DIAGNOSTIC MENU.***



System Setup

✓ ***System Setup*** allows:

- ❒ Adjustments to display contrast.
- ❒ Selecting language.
- ❒ Checking display pixels.
- ❒ Checking keyboard operations.
- ❒ Checking tools memory.
- ❒ Viewing tools information.
- ❒ Upgrading the tool.

✓ ***System Setup*** settings remain even if internal battery becomes discharged or is removed.

From ***DIAGNOSTIC MENU*:**

1.Select *System Setup.*

•Use **UP** or **DOWN** arrow key to highlight ***System Setup***.

•Press **ENTER**.

Adjusting Display Contrast

From ***System Setup*** menu:

1.Select *Adjust Contrast.*

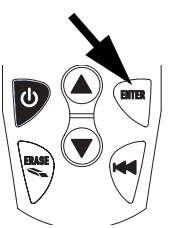
- Use **UP** or **DOWN** arrow key to highlight ***Adjust Contrast***.
- Press **ENTER.**

2.Darken or Lighten Display Contrast.

- Use **UP** arrow key to darken Contrast.
- Use **DOWN** arrow key to lighten Contrast.

3.Save Contrast Setting

- Press **ENTER**



4.Press Back to exit without saving or changing.

Language Setup

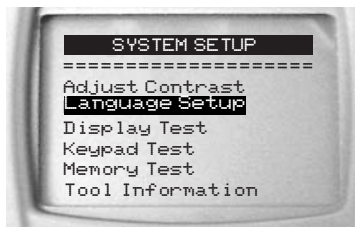
✓ English is the Default language.

From ***System Setup*** menu:

1.Choose *Language Setup.*

•Use **UP** or **DOWN** arrow key to highlight ***Language Setup***.

•Press **ENTER**.

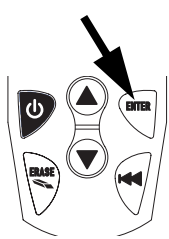


2.Select Desired Language.

•Use **UP** or **DOWN** arrow key to highlight desired language.

3.Save Language Setting.

•Press **ENTER**.



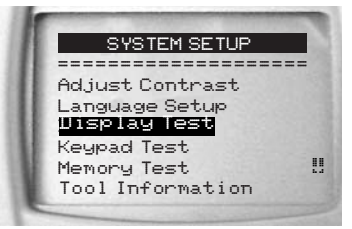
Display Test

The ***Display Test*** checks the pixels on the display.

✓ The test turns on every pixel of the LCD display

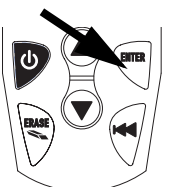
1.Select *Display Test.*

•Use **UP** or **DOWN** arrow key to highlight ***Display Test***.



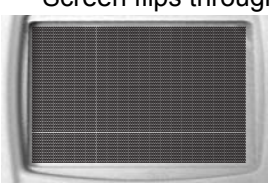
2. Start *Display Test.*

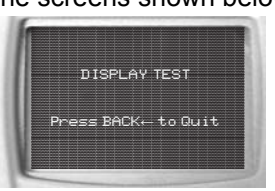
•Press **ENTER.**



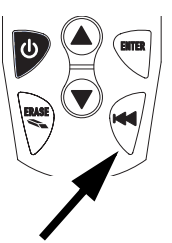
3. Look for Missing Spots.

- In solid black characters.
- Screen flips through the screens shown below.





4. When Done, Press BACK Key.

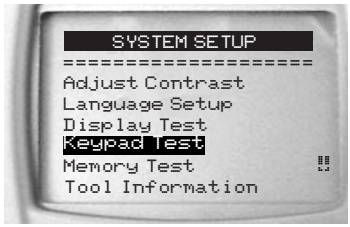


Keypad Test

The ***Keypad Test*** verifies the keys are working correctly.

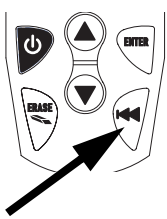
1.Select *Keypad Test*.

- Use **UP** or **DOWN** arrow key to highlight ***Keypad Test***.
- Press **ENTER**.



2. Press a KEY.

- Key name or scroll direction displays.
- The only exception is the **BACK** key. When **BACK** key is pressed ***System Setup*** menu returns.



✓ If ***System Setup*** menu does not return, **BACK** key is not working.

Memory Test

✓ The ***Memory Test*** tests RAM, ROM and EEPROM Memory.

✓ Dots update along the bottom of the screen to show progress of ***Memory Test.***

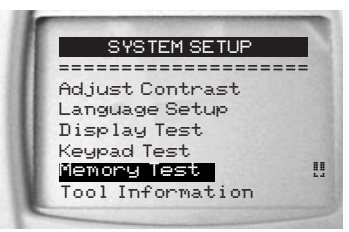
✓ Run the ***Memory Test*** if the tool has trouble:

- ❒ Reviewing stored data.
- ❒ Displaying trouble code definitions.
- ❒ Doing any function that uses internal memory.
- ❒ Remembering language or contrast settings.

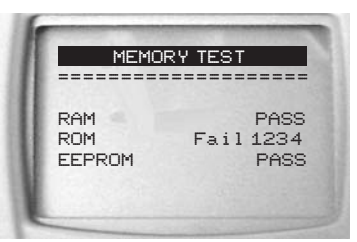
1.Select *Memory Test*.

•Use **UP** or **DOWN** arrow key to highlight ***Memory Test***.

•Press **ENTER**.



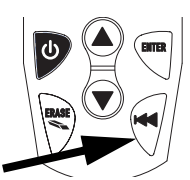
✓ Dots update along the bottom of the screen to show progress of Memory Test.



- ❒ ***Memory Test*** may take several minutes to complete.
- ❒ ***Memory Test*** results display.
  - ❒ PASS displays if there are no problems.
  - ❒ Fail displays if RAM, ROM or EEPROM fail.
    - ❒ If tool has a memory test problem, the tool will require service.
    - ❒ Contact Customer Service.

2. Return to *System Setup* Menu.

•Press **BACK**.

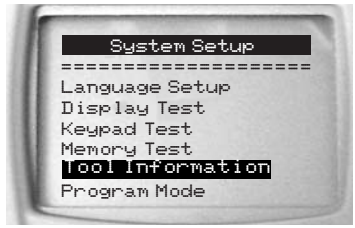


Tool Information

From ***System Setup*** menu:

1.Select *Tool Information*

- Use **UP** or **DOWN** arrow key to highlight ***Tool Information***.
- Press **ENTER.**



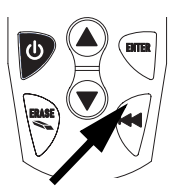
2.View *Tool Information*.

3.Write Down *Tool Information*.

- In space provided on inside front cover.

4.Return to *System Setup* Menu.

- Use **BACK** key.



Program Mode

Use Program Mode for updating and upgrading the tool. Refer to instructions that are provided with update or upgrade.

Section 5 – Troubleshooting

Error Messages

Check the following if an error message displays:

- ❒ Make sure vehicle is OBD II compliant.
- ❒ Verify ignition key is ON and not in the ACCESSORIES position.
- ❒ Make sure cable connects to vehicle's Data Link Connector.
- ❒ Look at Data Link Connector and check for cracked or recessed pins, or for any substance that could prevent a good electrical connection.
- ❒ Check for bent or broken pins.
- ❒ Check for blown fuses.
- ❒ Make sure the vehicles control module has a good ground.
- ❒ Verify battery voltage is at least 8.0V.
- ❒ Verify the control module is not defective. Refer to the vehicle service manual to diagnose the control module.

Tool Does Not Power Up

✓ Review "**Safety Precautions**" before troubleshooting.

Do the following if the tool will not power up, communicate with vehicle's Control Module, pass Tool Self-Tests, or functions incorrectly in any other way:

- ❒ Check Data Link Connector pins.
- ❒ Reconnect Data Link Connector.
- ❒ Check vehicle battery to make sure at least 8.0 volts is present.
- ❒ Contact Technical Support.

Operating Error or Erroneous Data

An **Operating Error** or **Erroneous Data** occurs if vehicle's computer(s) stop(s) communicating with tool.

1.Make Selection.

- Use **UP** arrow key for ***YES.***
- Use **DOWN** arrow key for ***NO.***

✓ See "**Error Messages**" on page 5-1 for possible causes.

Appendix A – Glossary

A/C:
Air Conditioner.

A/D:
Analog to Digital.

A/F:
Air/Fuel ratio. The proportion of air and fuel delivered to the cylinder for combustion. For example, an A/F ratio of 14:1 denotes 14 times as much air as fuel in the mixture. Ideally the A/F ratio is 14.7:1.

ABS:
Anti-lock Brake System.

AC Clutch Relay:
The PCM uses this relay to energize the A/C clutch, turning the A/C compressor on or off.

AC Pressure Sensor:
Measures air conditioning refrigerant pressure and sends a voltage signal to the PCM.

AC Pressure Switch:
A mechanical switch connected to the A/C refrigerant line. The switch is activated (sending a signal to the PCM) when the A/C refrigerant pressure becomes too low or high.

Actuator:
Actuators such as relays, solenoids, and motors allow the PCM to control the operation of vehicle systems.

Air Injection Reaction (AIR) System:
An emission control system operated by the PCM. During cold starts, an air pump injects outside air into the exhaust manifold to help burn hot exhaust gases. This reduces pollution and speeds warm-up of oxygen sensors and catalytic converters. After the engine is warm, the air will either be “dumped” back to the atmosphere (or into the air cleaner assembly) or sent to the catalytic converter.

APP:
Acceleration Pedal Position (Sensor.)

ASR:
Acceleration Slip Regulation.

AutoScanner ®:
A device that interfaces with a vehicle to Read and Erase Diagnostic Trouble Codes through an OBD II data link.

Bank x:
The standard way of referring to the bank of cylinders containing cylinder #x. In-line engines have only one bank of cylinders. Most commonly used to identify the location of oxygen sensors. See **O2S**, **Sensor x**, **Sensor x**.

BARO:
Barometric Pressure Sensor. See **MAP Sensor**.

BBV:
Brake Boost Vacuum (Sensor.)

BCM:
Body Control Module.

Boost Control Solenoid:
A solenoid that is energized by the PCM, in order to control turbo/supercharger boost pressure.

Brake Switch Signal:
An input signal to the PCM indicating that the brake pedal is being pressed. This signal is typically used to disengage Cruise Control systems and Torque Converter Clutch (TCC) solenoids. See also **TCC**.

CAM:
Camshaft Position Sensor. Sends a frequency signal to the PCM in order to synchronize fuel injector and spark plug firing.

Catalytic Converter:
Designed to reduce exhaust emissions.

CAN:
Controller Area Network.

CARB:
California Air Resources Board. Governing body for emissions control in California.

CKP REF:
Crankshaft Position Reference.

CKP:
Crankshaft Position. See **CPS**.

CKT:
Circuit.

Closed Loop (CL):
A feedback system that uses the O2 Sensor(s) to monitor the results of combustion. Based on the signal(s) from the O2 sensor(s), the PCM modifies the air/fuel mixture to maintain optimum performance with lowest emissions. In closed loop mode, the PCM can "fine tune" control of a system to achieve an exact result.

CMP:
Camshaft Position Sensor.

CO:
Carbon Monoxide; odorless gas produced by incomplete combustion.

Continuous Memory Codes:
See **Pending Codes**.

CPS:
Crankshaft Position Sensor. Sends a frequency signal to the PCM. It is used to reference fuel injector operation and synchronize spark plug firing on distributorless ignition systems (DIS).

CTS:
Coolant Temperature Sensor. A resistance sensor that sends a voltage signal to the PCM indicating the temperature of the coolant. This signal tells the PCM whether the engine is "cold" or "warm".

CVRTD:
Continuous Variable Real Time Damping.

D/R:
Drive/Reverse.

Data Link Connector (DLC):
Connector providing access and/or control of the vehicle information, operating conditions, and diagnostic information. Vehicles with OBD II use a 16-pin connector located in the passenger compartment.

Data Stream:
The actual data communications sent from the vehicle's PCM to the data connector.

DEPS:
Digital Engine Position Sensor.

Detonation:
See **Knock**.

DI/DIS:
Direct Ignition/Distributorless Ignition System. A system that produces the ignition spark without the use of a distributor.

DPFE:
Differential Pressure Feedback – Exhaust Gas Recirculation Sensor

Drive Cycle:
Vehicle operation for a period of time so the systems can be monitored.

DTC:
Diagnostic Trouble Code. An alphanumeric identifier for a fault condition identified by the On Board Diagnostic System.

Duty Cycle:
A term applied to signals that switch between “on” and “off”. Duty cycle is the percentage of time the signal is “on”. For example, if the signal is “on” only one fourth of the time, then the duty cycle is 25%. The PCM uses duty cycle type signals to maintain precise control of an actuator.

EBCM:
Electronic Brake Control Module.

EBTCM:
Electronic Brake/Traction Control Module.

ECM
Engine Control Module *or* Electronic Control Module.

ECT:
Engine Coolant Temperature sensor. See **CTS**.

EEPROM:
Electrically Erasable Programmable Read Only Memory.

EFE:
Early Fuel Evaporation.

EFI:
Electronic Fuel Injection. Any system where a computer controls fuel delivery to the engine by using fuel injectors.

EGR:
Exhaust Gas Recirculation. The PCM uses the EGR system to recirculate exhaust gases back into the intake manifold to reduce emissions. EGR is used only during warm engine cruise conditions.

EOP:
Engine Oil Pressure (Switch.)

EOT
Engine Oil Temperature (Sensor.)

EPA:
Environmental Protection Agency.

ESC:
Electronic Spark Control. An ignition system function that warns the PCM when “knock” is detected. The PCM will then retard spark timing to eliminate the knocking condition.

EST:
Electronic Spark Timing. An ignition system that allows the PCM to control spark advance timing. The PCM determines optimum spark timing from sensor information — engine speed, throttle position, coolant temperature, engine load, vehicle speed, Park/Neutral switch position, and knock sensor condition.

EVAP:
Evaporative Emissions System.

FC:
Fan Control.

Freeze Frame:
Is a “snapshot” of the operating conditions at the time of an emission-related fault.

FTP:
Federal Test Procedure. Strict test of vehicle’s emissions.

Ground (GND):
An electrical conductor used as a common return for an electric circuit(s).

Hall Effect Sensor:
Any of a type of sensor utilizing a permanent magnet and a transistorized Hall Effect switch. Hall Effect type sensors may be used to measure speed and position of the crankshaft or camshaft — for spark timing and fuel injector control.

HO2S:
Heated Oxygen Sensor. See **O2S**.

HVAC:
Heating, Ventilation & Air Conditioning (System.)

I/M:
Inspection and Maintenance. An emission control program.

IAC:
Idle Air Control. A device mounted on the throttle body which adjusts the amount of air bypassing a closed throttle so that the PCM can control idle speed.

IAT:
Intake Air Temperature (Sensor.)

ICM:
Ignition Control Module.

IMRC:
Intake Manifold Runner Control.

IPC:
Instrument Panel Cluster.

ISC:
Idle Speed Control. A small electric motor mounted on the throttle body and controlled by the PCM. The PCM can control idle speed by commanding the ISC to adjust its position.

ISO:
International Organization of Standardization also know as International Standards Organization.

KAM:
Keep Alive Memory.

Knock Sensor (KS):
Used to detect engine detonation or “knock.” The sensor contains a piezoelectric element and is threaded into the engine block. Special construction makes the element sensitive only to engine vibrations associated with detonation.

Knock:
Uncontrolled ignition of the air/fuel mixture in the cylinder. Also referred to as detonation or ping. Knock indicates extreme cylinder pressures or “hotspots” which are causing the air/fuel mixture to detonate prematurely.

KOEO:
Key On — Engine Off.

KOER:
Key On — Engine Running.

LCD:
Liquid Crystal Display.

LTFT:
Long Term Fuel Trim.

M/T:
Manual transmission or manual transaxle.

MAF:
Mass Air Flow Sensor. Measures the amount and density of air entering the engine and sends a frequency or voltage signal to the PCM. The PCM uses this signal in its fuel delivery calculations.

MAP:
Manifold Absolute Pressure Sensor. Measures intake manifold vacuum or pressure and sends a frequency or voltage signal (depending on sensor type) to the PCM. This gives the PCM information on engine load for control of fuel delivery, spark advance, and EGR flow.

MAT:
Manifold Air Temperature sensor. A resistance sensor in the intake manifold that sends a voltage signal to the PCM indicating the temperature of the incoming air. The PCM uses this signal for fuel delivery calculations.

MIL:
Malfunction Indicator Lamp. “Check Engine” or “Service Engine Soon” light are examples of what a MIL is called. A required on-board indicator to alert the driver of an emission-related malfunction.

Misfire:
Caused by the air fuel ratio being incorrect.

Monitor:
A test performed by the on-board computer to verify proper operation of emission related systems or components.

MPFI or MFI:
Multi-Port Fuel Injection. MPFI is a fuel injection system using one (or more) injector(s) for each cylinder. The injectors mounted in the intake manifold, and fired in groups rather than individually.

NOx:
Oxides of Nitrogen. The system EGR and Cam Shafts injects exhaust gases into the intake manifold to reduce these gases at the tailpipe.

O2S:
Oxygen Sensor. Generates a voltage of 0.6 to 1.0 volts when the exhaust gas is rich (low oxygen content). The voltage changes to 0.4 volts or less when the exhaust gas is lean (high oxygen content). This sensor only operates after it reaches a temperature of approximately 349ºC (660ºF). O2 sensors are usually found both upstream and downstream of the catalytic converter. The PCM uses these sensors to fine tune the air-fuel ratio and to monitor the efficiency of the catalytic converter. See **Bank 1**, **Bank 2**, **Sensor 1**, **Sensor 2**.

OBD II:
On-Board Diagnostics, Second Generation. OBD II is a U.S. Government-mandated standard requiring all cars and light trucks to have a common data connector, connector location, communication protocol, DTCs and code definitions. OBD II first appeared on vehicles in late 1994, and is required to be present on all cars sold in the US after January 1, 1996.

ODM:
Output Device Monitor.

Open Loop (OL):
A control system mode that does not monitor the output to verify if the desired achieved results. A fuel delivery system will usually operate in open loop mode during cold engine warm-up because the oxygen sensors are not yet ready to send a signal. Without the oxygen sensor signal, the computer cannot check the actual results of combustion.

PCM:
Powertrain Control Module. The “brains” of the engine control system and transmission control system housed in a metal box with a number of sensors and actuators connected via a wiring harness. Its job is to control fuel delivery, idle speed, spark advance timing, and emission systems. The PCM receives information from sensors, then energizes various actuators to control the engine. The ECM (Engine Control Module) is another name used for the PCM.

Pending Codes:
Also referred to as Continuous Memory codes and Maturing Diagnostic Trouble Codes. Pending Codes may be set by emission related powertrain components and systems. If the fault does not occur after a certain number of drive cycles, memory erases the code.

PID:
Parameter Identification. Identifies an address in memory which contains vehicle operating information.

PNP:
Park/Neutral Position. This is a switch that tells the PCM when the gear shift lever is in the Park or Neutral position. When in Park or Neutral, the PCM will operate the engine in an “idle” mode.

PROM:
Programmable Read-Only Memory. The PROM contains programming information the PCM needs to operate a specific vehicle model/engine combination.

PSPS:
Power Steering Pressure Switch.

Purge Solenoid:
Controls the flow of fuel vapors from the carbon canister to the intake manifold. The canister collects vapors evaporating from the fuel tank, preventing them from escaping to the atmosphere and causing pollution. During warm engine cruise conditions, the PCM energizes the Purge Solenoid so the trapped vapors are drawn into the engine and burned.

PWM:
Pulse Width Modulated.

QDM:
Quad Driver Module.

RAM:
Random Access Memory.

Relay:
An electromechanical device in which connections in one circuit are switched.

Reluctance Sensor:
A type of sensor typically used to measure crankshaft or camshaft Speed and/or position, driveshaft speed, and wheel speed.

ROM:
Read-Only Memory. Permanent programming information stored inside the PCM, containing the information the PCM needs to operate a specific vehicle model/engine combination.

RPM:
Revolutions Per Minute.

SAE:
Society of Automotive Engineers.

Scan Tool:
A device that interfaces and communicates Diagnostic Trouble Codes, plus other valuable information for troubleshooting a vehicle through a data link.

SDM:
Sensing and Diagnostic Module.

Sensor x:
A standard term used to identify the location of oxygen sensors. Sensor 1 is located upstream of the catalytic converter. See **O2S**, **Bank 1**, **Bank 2**.

Sensor:
Any device that reports information to the PCM. The job of the sensor is to convert a parameter such as engine temperature into an electrical signal that the PCM can understand.

SFI or SEFI:
Sequential Fuel Injection or Sequential Electronic Fuel Injection. A fuel injection system that uses one or more injectors for each cylinder. The injectors are mounted in the intake manifold and are fired individually.

Solenoid:
A device consisting of an electrical coil which when energized, produces a magnetic field in a plunger, which is pulled to a central position. A solenoid may be used as an actuator in a valve or switch.

STFT:
Short Term Fuel Trim.

STS:
Service Throttle Soon.

TAC:
Throttle Actuator Control.

TBI:
Throttle Body Injection. A fuel injection system having one or more injectors mounted in a centrally located throttle body, as opposed to positioning the injectors close to an intake valve port. Central Fuel Injection (CFI) is another name for TBI on some vehicles.

TCC:
Torque Converter Clutch.

TCM:
Transmission Control Module.

TCS:
Traction Control System for PCM and brakes.

TDC:
Top Dead Center. When a piston is at its uppermost position in the cylinder.

TFP:
Transmission Fluid Pressure.

TFT:
Transmission Fluid Temperature (Sensor.)

Throttle Body:
A device which performs the same function as a carburetor in a fuel injection system. On a throttle body injection (TBI) system, the throttle body is both the air door and the location of the fuel injectors. On port fuel injection systems (PFI, MPFI, SFI, etc.), the throttle body is simply an air door. Injectors receive fuel as each intake port activates. In each case, the throttle body is attached to the accelerator pedal.

TPS:
Throttle Position Sensor. Potentiometer-type sensor connected to the throttle shaft. Its voltage signal output increases as the throttle opens. The PCM uses this signal to control many systems such as idle speed, spark advance, fuel delivery, etc.

Traction Assist:

Assist in traction with brakes only.

TTS:
Transmission Temperature Sensor. A resistance sensor mounted in the transmission housing in contact with the transmission fluid. It sends a voltage signal to the PCM indicating the temperature of the transmission.

VECI:
Vehicle Emission Control Information. A decal located in the engine compartment containing information about the emission control systems found on the vehicle. The VECI is the authoritative source for determining whether a vehicle is OBD II compliant.

VIN:
Vehicle Identification Number. This is the factory-assigned vehicle serial number. This number is stamped on a number of locations throughout the vehicle, but the most prominent location is on top of the dashboard on the driver's side, visible from outside the car. The VIN includes information about the car, including where it was built, body and engine codes, options, and a sequential build number.

VSS:
Vehicle Speed Sensor. Sends a frequency signal to the PCM. The frequency increases as the vehicle moves faster to give the PCM vehicle speed information used to determine shift points, engine load, and cruise control functions.

VTD:
Vehicle Theft Deterrent.

Warm-up Cycle:
Warm-up cycle is when the engine coolant temperature rises at least 40 degrees above that at engine start up.

WOT:
Wide-Open Throttle. The vehicle operating condition brought about when the throttle is completely (or nearly) open. The PCM will typically deliver extra fuel to the engine and de-energize the A/C compressor at this time for acceleration purposes. The PCM uses a switch or the Throttle Position Sensor to identify the WOT condition.

Appendix B – Global PID's

Global PID Definitions

All global parameter identification data (PID) listed were verified on actual vehicles to guarantee accuracy. It is possible that some newer vehicles may contain data different from that listed. Always refer to vehicle service manual for manufacturer specific PIDs.

Remember, always refer to a vehicle service manual for detailed diagnostic procedures when troubleshooting PID values.

Types of Data Parameters

INPUT: These data parameters are obtained from sensor circuit outputs. Sensor circuit outputs are inputs to vehicles PCM. For example, if Oxygen Sensor circuit was generating a 400mV signal, then AutoScanner ® would read O2S (v).40.

OUTPUT: These data parameters are outputs or commands that come directly from computer module(s). For example, the ignition spark advance is controlled by PCM, on most vehicles, monitoring this PID shows spark output from PCM.

CALCULATED VALUE: These data parameters are calculated after analyzing various inputs to the vehicles computer module(s). For example, the engine load. The PCM calculates this from sensor inputs and displays in a percentage.

PCM VALUE: Information that is stored in the computer module(s) memory and determined to be useful to service technician. An example of this is TROUBLE CODE values, the DTC that caused a freeze frame capture.

Global Data Parameter List:

NOTE: Several different causes can have the same parameter indication. For information on diagnostics consult vehicle service manuals.

NOTE: Tool will **ONLY** display the PID's the vehicle supports.

Absolute Evap System Vapor Pressure

Absolute Load Value

Absolute Throttle Position X

Air Flow Rate

Alcohol Fuel Percentage

Ambient Air Temperature

Barometric Pressure

Catalyst Temp BankX SensorX

Commanded EGR

Commanded Equivalence Ratio

Commanded Evap Purge

Commanded Secondary Air Status

Commanded Throttle Actuator Control

Control Module Voltage

Coolant Temp

Distance Since Codes Cleared

Distance Since MIL Active

DTC that caused freeze frame data storage

EGR Error

Engine RPM

Equivalence ratio (Bx-Sy)

Evap Vapor Press

Evap Vapor Press

Fuel Level Input

Fuel Pressure

Fuel Rail pressure (gauge)

Fuel Rail pressure (mnfld)

Fuel System X

Ignition Timing Adv

Intake Air Temp

Load Value

Long Term Fuel Trim X

Long Term Secondary O2S Fuel Trim Bank X

Malfunction Indicator Lamp (MIL) Status

MAP Sensor

O2Sxx

Power Take Off

Relative Throttle Position

Short Term Fuel Trim (Bx-Sy)

Short Term Fuel TrimX

Short Term Secondary O2S Fuel Trim Bank X

Throttle Position

Time run by the engine while MIL is ON

Time since DTCs cleared

Time Since Engine Start

Type of fuel being utilized by the vehicle

Vehicle Speed

Warmups Since Codes Cleared

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If you have any questions about the operation of the product, call (800) 228-7667.

Repair

When sending your SPX electronic product in for repair, include the following:

- contact name
- telephone number
- description of the problem
- proof-of-purchase for warranty repairs
- preferred method of payment for non-warranty repairs

For non-warranty repairs, please call Tech Support at (800) 228-7667. You will be advised of the cost of repair and any freight charges.

Send the unit to:

SPX Service Solutions
15825 Industrial Parkway
Cleveland Ohio 44135
Attn.: Repair

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